

Name: ~~Mr. Davis~~ Mr. Davis Solution Key

1. A line contains two points  $A(-3, 1)$  and  $B(2, 11)$ .

- a. Determine the slope of the line.

$$m = \frac{11-1}{2-(-3)} = \frac{10}{5} = 2 \quad \text{Answer: } m = 2$$

- b. Determine an equation of the line in slope-intercept form.

Follow the work along the rows horizontally

$$y = mx + b \quad y = 2x + b \quad \text{Using } (2, 11) \quad 11 = 2(2) + b \quad b = 7$$

$$y = 2x + 7 \quad \text{Answer}$$

- c. Determine the coordinates of the x-intercept of the line.

x-intercept implies the point  $(x, 0)$  y becomes 0

$$0 = 2x + 7 \quad -7 = 2x \quad -3\frac{1}{2} = x \quad (-3\frac{1}{2}, 0) : \text{Answer}$$

- d. Give the coordinates of the y-intercept of the line.

y-intercept implies the point  $(0, y)$  x becomes 0

$$y = 2(0) + 7 \quad y = 7 \quad (0, 7) : \text{Answer}$$

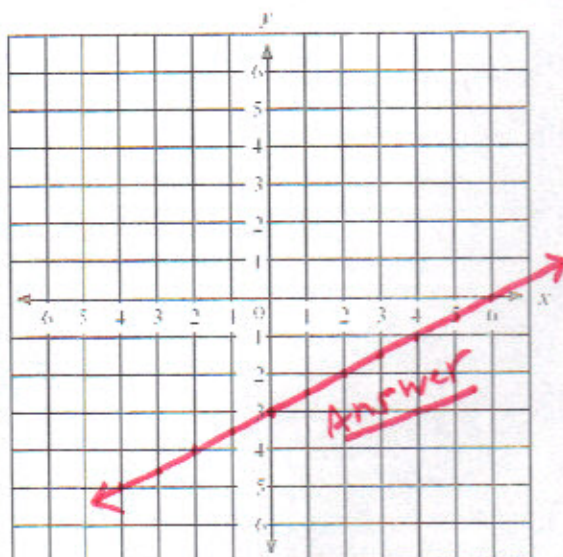
- e. Convert the equation found in part (b.) above to standard form.

$$y = 2x + 7 \quad -2x + y = 7 \quad 2x - y = -7 : \text{Answer}$$

2. Graph the line with equation  $y = \frac{1}{2}x - 3$

What is the slope of the line?

$$m = \frac{1}{2} : \text{Answer}$$



3. A line contains two points  $P(2,3)$  and  $T(7,3)$ . Determine an equation for the line.

Follow  
the work  
horizontally  
along the  
rows

$$\text{slope } m = \frac{3-3}{7-2} = \frac{0}{5} = 0 \quad \text{horizontal line}$$

$$y = mx + b \quad y = 0x + b \quad y = b \quad \text{both y-coordinates are 3.}$$

This is the line on which all y-coordinates are 3,

therefore,  $b = 3$

Answer:  $y = 3$   
equation of the line

4. Solve the literal equation  $Ax + By = C$  for  $y$

$$Ax + By = C$$

$$By = C - Ax$$

$$y = \frac{C - Ax}{B} : \text{Answer}$$

5. Write an equation for the line shown in slope-intercept form. Then convert to standard form.

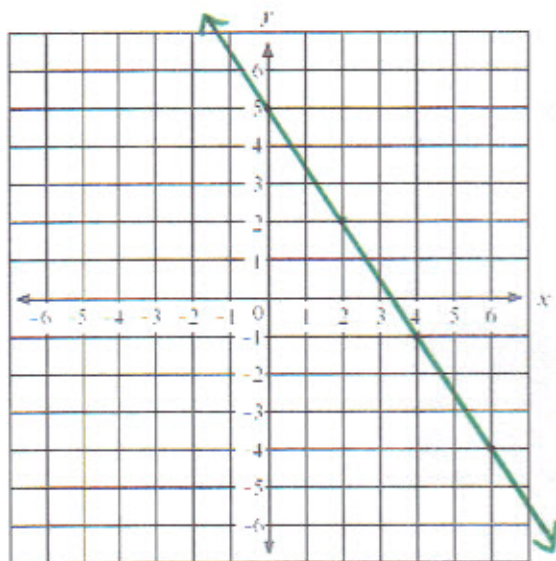
By inspection and counting from  $(0,5)$  to  $(2,2)$ , we can see the slope is  $m = -\frac{3}{2}$

The y-intercept is  $(0,5)$

$$y = -\frac{3}{2}x + 5 : \text{Answer}$$

$$2y = -3x + 10$$

$$3x + 2y = 10 : \text{Answer}$$



6. A line contains two points  $M(-1,5)$  and  $N(-1,-4)$ . Determine an equation for the line.

$$\text{slope } m = \frac{-4-5}{-1-(-1)} = \frac{-9}{0} = \text{undefined} \quad \text{Must be a vertical line.}$$

This is the line on which all x-coordinates are  $x = -1$

The equation is  $x = -1 : \text{Answer}$

7. Find an equation of the line with slope  $m = 3$  and Point  $P(-7,1)$ .

$$y = mx + b \quad y = 3x + b \quad 1 = 3(-7) + b \quad 1 = -21 + b$$

$$22 = b$$

$$y = 3x + 22 : \text{Answer}$$

8. Solve the literal equation  $A = 2\pi r^2 + 2\pi rh$  for  $h$ .

$$A = 2\pi r^2 + 2\pi rh$$

$$A - 2\pi r^2 = 2\pi rh$$

$$\frac{A - 2\pi r^2}{2\pi r} = h$$

$$h = \frac{A - 2\pi r^2}{2\pi r} : \text{Answer}$$

9. Find an equation of the line with slope  $m = \frac{5}{3}$  and y-intercept  $b = -10$

$$y = \frac{5}{3}x - 10 : \text{Answer}$$

10. Kayla gets in her cab and notices the initial up-front fee on the meter. After 2 minutes, the meter reads \$7.50 and after 7 minutes, the meter reads \$13.75.

(minutes, dollars) = (x, y)

- a. What is the rate of change in this scenario?

rate of change  $m = \frac{13.75 - 7.50}{7 - 2} = \frac{6.25}{5} = \$1.25$   $(2, 7.50)$   $(7, 13.75)$   $\$1.25 \text{ per min.} : \text{Answer}$

- b. What is the equation or rule or formula that gives the cab fare as a function of time?

$$y = 1.25x + 5.00 : \text{Answer}$$

\$5.00 is the zeroth or 0<sup>th</sup> term which is the initial meter reading at the start of the cab ride

- c. How much would a 15-minute cab ride cost?

$$x = 15 \quad y = 1.25(15) + 5$$

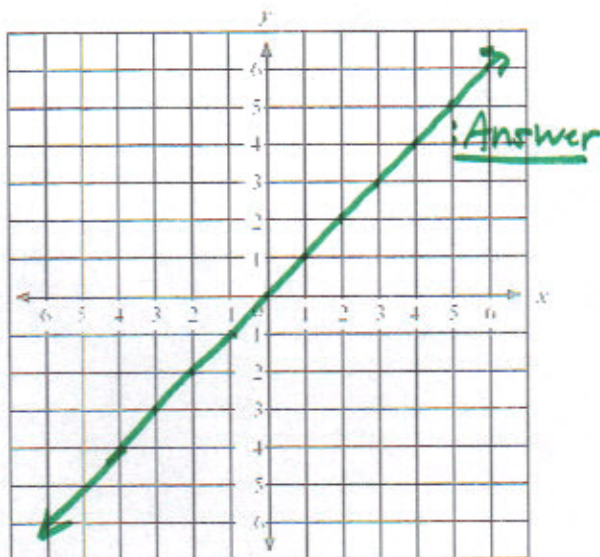
$$= 18.75$$

$$\$18.75 : \text{Answer}$$

11. Graph the line with equation  $y = x$

What is the slope of the line?

$$\text{Slope } m = 1 : \text{Answer}$$



12. Determine an equation of the line that contains the point  $P(-5, 2)$  and is parallel to the line

with equation  $2x - 3y = -6$ .

$$2x - 3y = -6 \quad -3y = -2x - 6 \quad y = \frac{2}{3}x + 2$$

Follow the  
work along  
from left  
to right  
horizontally

$$y = mx + b$$

$$y = \frac{2}{3}x + b$$

$$2 = \frac{2}{3}(-5) + b$$

$$2 = -\frac{10}{3} + b$$

$$2 + \frac{10}{3} = b$$

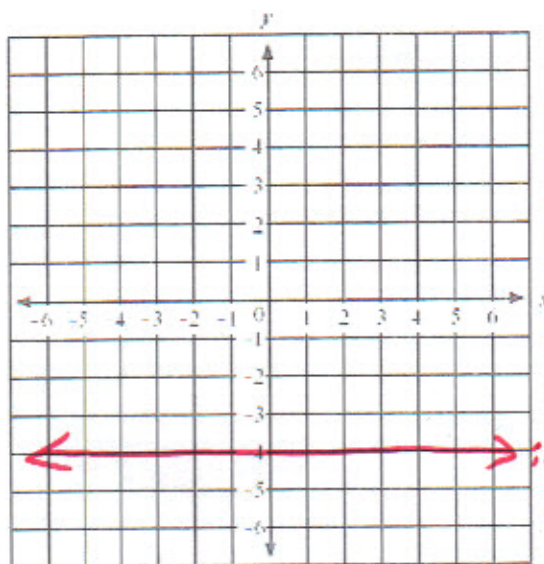
$$2 + 3\frac{1}{3} = b \quad b = 5\frac{1}{3}$$

$$y = \frac{2}{3}x + 5\frac{1}{3} : \underline{\text{Answer}}$$

13. Graph the line with equation  $y = -4$

What is the slope of the line?

$$m = 0 : \underline{\text{Answer}}$$



14. Solve the literal equation  $P = 2(l + w)$  for  $w$ .

Follow  
The work  
horizontally

$$P = 2(l + w)$$

$$P = 2l + 2w$$

$$P - 2l = 2w$$

$$\frac{P - 2l}{2} = w$$

$$w = \frac{P - 2l}{2} : \underline{\text{Answer}}$$

15. Determine an equation of the line that contains the point  $P(-1, -5)$  and is perpendicular to

the line with equation  $8x - 2y = 5$ .

$$8x - 2y = 5 \quad -2y = -8x + 5 \quad y = 4x - \frac{5}{2} \quad m = 4$$

For perpendicular line  $m = -\frac{1}{4}$   $y = -\frac{1}{4}x + b$   $-5 = -\frac{1}{4}(-1) + b$

$$-5 = \frac{1}{4} + b$$

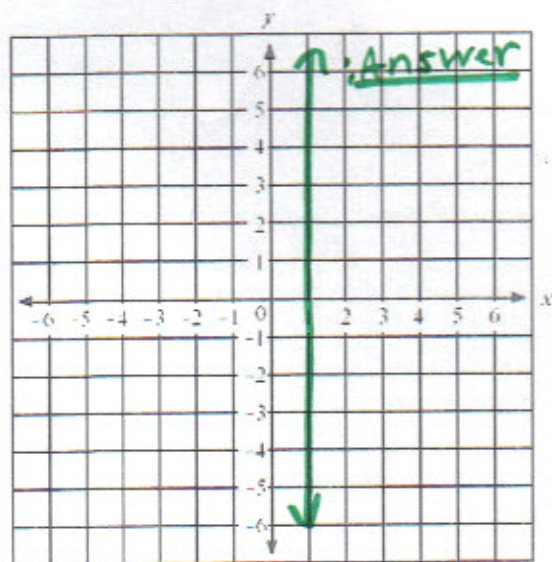
$$-5\frac{1}{4} = b$$

$$y = -\frac{1}{4}x - 5\frac{1}{4} : \underline{\text{Answer}}$$

16. Graph the line with equation  $x = 1$

What is the slope of this line?

$m = \text{undefined}$  : Answer



17. Determine which tables contain data representing a proportional relationship.

a.

x	y
3	1
6	2
9	3
12	4
15	5

Yes  $m = \frac{1}{3}$

$y = \frac{1}{3}x$

b.

X	y
1	3
2	5
3	7
4	9
5	11

No  
there is  
no constant  
slope

c.

x	y
-1	1
-2	2
-3	3
-4	4
-5	5

Yes  $m = -1$

$y = -x$

d.

x	y
-4	-10
-2	-5
0	0
2	5
4	10

Yes  $m = \frac{5}{2}$

$y = \frac{5}{2}x$

Answers  
are below  
each  
Table

18. Write an equation for each line shown.

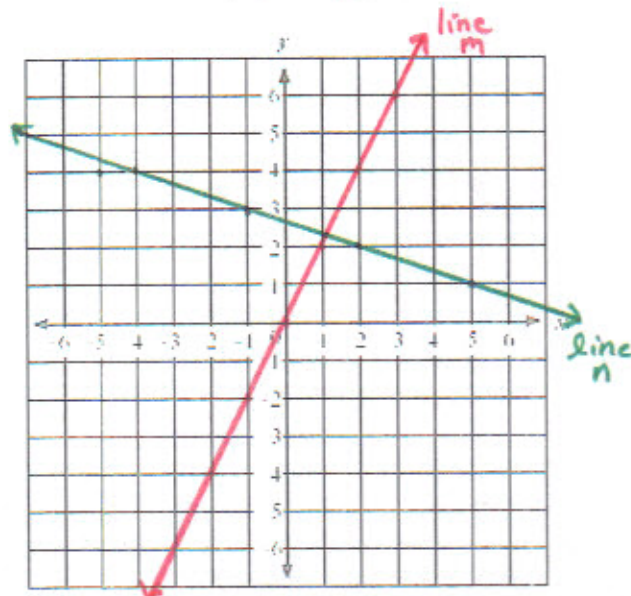
line m:  $y = 2x$

line n:  $y = -\frac{1}{3}x + b$

use (2, 2)  $2 = -\frac{1}{3}(2) + b$

$2 = -\frac{2}{3} + b$   $2\frac{2}{3} = b$

$y = -\frac{1}{3}x + 2\frac{2}{3}$  : Answer



19. Write a rule or equation or formula for the linear sequence  $-26, -20, -14, -8, \dots$

the slope or rate of change is 6  $m = 6$

The 0<sup>th</sup> term is -32

$y = 6x - 32$  : Answer

20. A water pump can remove water from a pool at a constant rate. 84 gallons are removed in 4 minutes and 189 gallons are removed in 9 minutes.

- a. What is the rate in gallons per minute at which the water is being pumped out of the pool?

$$(x, y) = (\text{min, gallons}) \quad (4, 84) \text{ \& } (9, 189) \quad m = \frac{189 - 84}{9 - 4}$$

$$m = \frac{105}{5} = 21 \text{ gallons/min. : Answer}$$

- b. What is a rule or equation or formula that represents the amount of water being pumped out as a function of time?

$$y = mx + b \quad y = 21x + b \quad \text{Use } (4, 84)$$

$$84 = 21(4) + b \quad 84 = 84 + b \quad 0 = b$$

$y = 21x$  : Answer  
Proportional  
Relationship

- c. How many gallons are pumped out after one hour?

$$x = 1 \text{ hour} = 60 \text{ minutes}$$

$$y = 21(60) = 1260 \text{ gallons : Answer}$$

- d. Do these data represent a proportional relationship?

Answer : Yes, because there is no  $b$  other than  $b = 0$   
 $y = 21x$

21. A sequence is defined by the formula  $u_n = 6n - 2$ .

- a. Calculate the first 4 terms of the sequence.

$$\begin{array}{cccc} n=1 & n=2 & n=3 & n=4 \\ u_1 = 4 & u_2 = 10 & u_3 = 16 & u_4 = 22 \end{array} \} \text{ Answer}$$

- b. What is the difference between successive terms of the sequence?

$$m = 6 : \text{Answer}$$

- c. What is the 0<sup>th</sup> term of the sequence?

$$b = -2 : \text{Answer}$$

- d. What is the slope or rate of change of the sequence of numbers?

$$m = 6 : \text{Answer}$$

- e. What is the 20<sup>th</sup> term of the sequence?

$$n = 20 \quad u_{20} = 6(20) - 2 = 120 - 2 = 118 : \text{Answer}$$

22. Considering the number of line segments in each drawing or term,

a. what is the rate of change in the sequence of drawings?

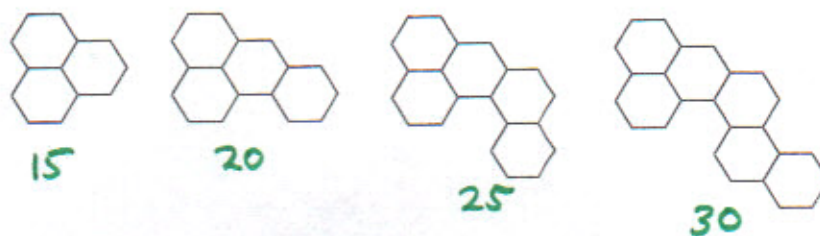
$$m = 5 : \underline{\text{Answer}}$$

b. Write a formula that represents the pattern.

$$0^{\text{th}} \text{ term is } 10 \quad y = 5x + 10 : \underline{\text{Answer}}$$

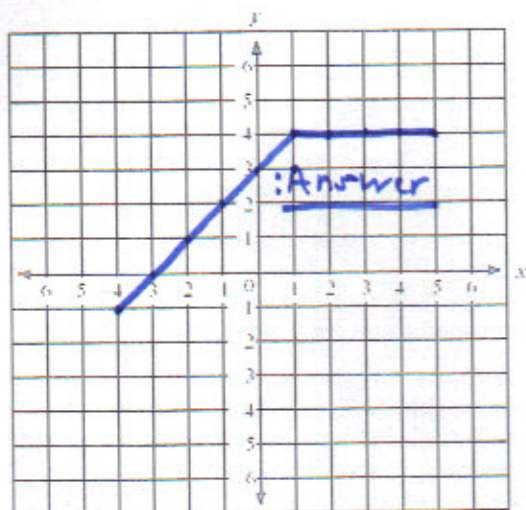
c. How many line segments would be in the 20<sup>th</sup> drawing or term?

$$y = 5(20) + 10 = 100 + 10 = 110 : \underline{\text{Answer}}$$

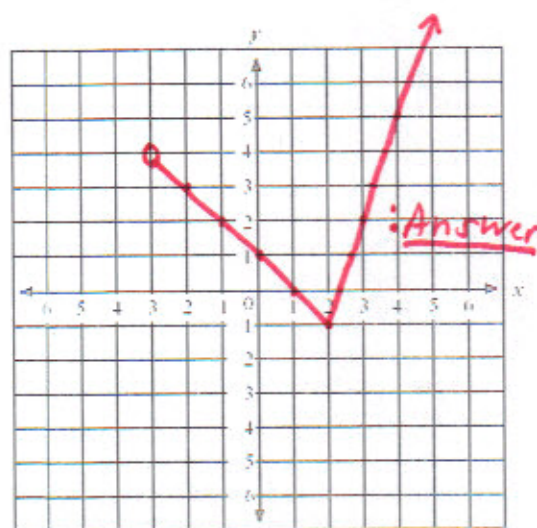


23. Draw a graph of each piecewise function defined below:

a.  $f(x) = \begin{cases} x+3 & \text{if } [-4, 1) \\ 4 & \text{if } [1, 5] \end{cases}$

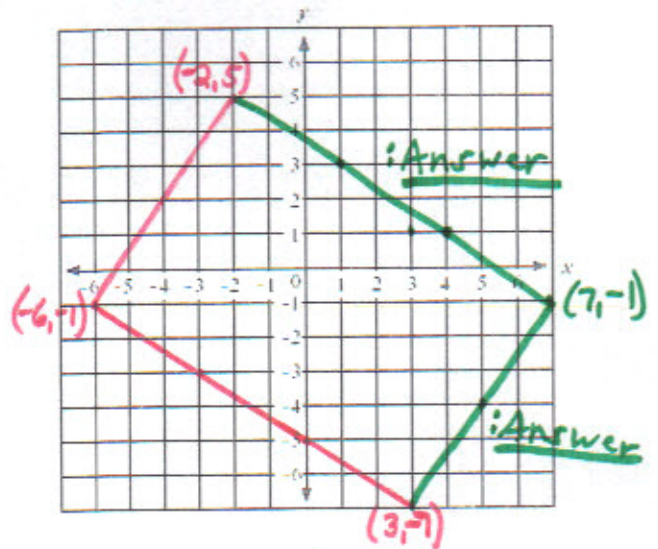


b.  $f(x) = \begin{cases} -x+1 & \text{if } (-3, 2] \\ 3x-7 & \text{if } (2, \infty) \end{cases}$  ← should be a parenthesis

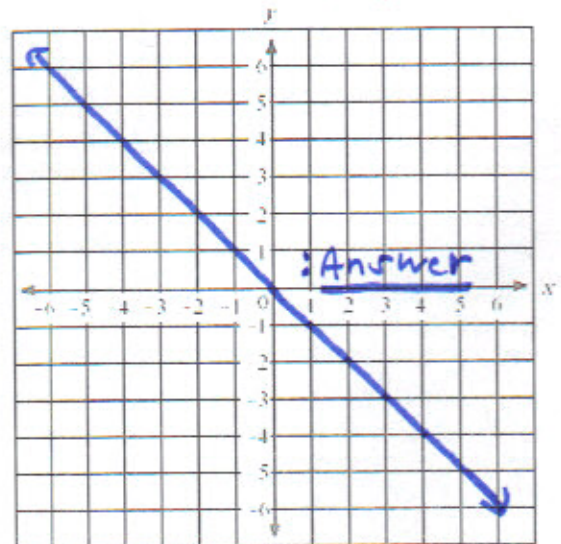


24. Carefully finish drawing the rectangle using slopes and given the information displayed in the graph shown. Write the coordinates of the fourth vertex or corner that you found.

$(7, -1)$  : Answer



25. Graph the line with equation  $y = -x$   
What is the slope of the line?



26. Solve the system of two equations by graphing.

$$4x + y = 3 \quad \& \quad x - 4y = -12$$

$$\begin{aligned} y &= -4x + 3 & -4y &= -x - 12 \\ & & \frac{-4y}{-4} &= \frac{-x}{-4} - \frac{12}{-4} \\ & & y &= \frac{x}{4} + 3 \\ & & y &= \frac{1}{4}x + 3 \end{aligned}$$

Intersection point  $(0, 3)$  : Answer

